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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,464	04/18/2001	Hui Chun Liu	11258-01 US	8863

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EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 07/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action	Application No.	Applicant(s)	
	09/836,464	LIU, HUI CHUN	
	Examiner	Art Unit	
	Shun Lee	2878	

--Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 16 June 2004 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

a) ☐ The period for reply expires _____months from the mailing date of the final rejection.

b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2. ☐ The proposed amendment(s) will not be entered because:

   (a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);

   (b) ☐ they raise the issue of new matter (see Note below);

   (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

   (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____.

3. ☐ Applicant's reply has overcome the following rejection(s): _____.

4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☒ The a)☐ affidavit, b)☐ exhibit, or c)☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because: *See Continuation Sheet*.

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☒ For purposes of Appeal, the proposed amendment(s) a)☐ will not be entered or b)☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:

   Claim(s) allowed: _____.

   Claim(s) objected to: _____.

   Claim(s) rejected: *4-7 and 9-24*.

   Claim(s) withdrawn from consideration: _____.

8. ☐ The drawing correction filed on _____ is a)☐ approved or b)☐ disapproved by the Examiner.

9. ☐ Note the attached Information Disclosure Statement(s)(PTO-1449) Paper No(s). _____.

10. ☒ Other: *See Continuation Sheet*

CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878

Continuation of 5. does NOT place the application in condition for allowance because: applicant argues that the combination of Delacourt et al. and Liu does not disclose or suggest doped quantum well layers having a doping density that is selected to be sufficiently large for providing high absorption during near room temperature operation since Delacourt et al. does not teach or suggest near room temperature of the first embodiment. Examiner respectfully disagrees. Delacourt et al. state (column 2, line 64 to column 4, line 64) that "The graph of FIG. 1 shows the energy levels of the carriers in the quantum structure used in the detector according to the invention ... If the level e1 is populated with electrons, a wave with a frequency v1 can be detected and absorbed by a transition from the level e1 towards the continuum of non-related states located above the potential barrier ... For the fundamental level e1 of the conduction band of the layer 1 to be populated with electrons, two alternative embodiments are possible. In a first embodiment, the layer 2 consists of a rather highly doped semiconductive material, doped with an N-type dopant, to enable detection without the detector being saturated. The wave to be detected is then systematically absorbed. According to a second alternative, the layer 2 consists of a non-doped semiconducting material, namely a material having a residual doping that is as low as can be achieved with known technologies. The fundamental level e1 is then populated by optical pumping ... The principle of operation of the detector according to the invention enables the use of types III-V semiconducting materials, especially alloys of the AlxGa1-xAs type for which the technology is a very standard one. With these materials, the thickness 1b of the layer 2, constituting the quantum well, should be smaller than 0.0068 microns so that the electrons have only one permitted level of discrete energy in the conduction band. Furthermore, for the detector to be capable of working at ambient temperature, the potential barrier to be crossed for the electrons, which has a value hv10, should be greater than k.T=26meV, k being the Boltzmann constant, T being equal to 300°K. Finally, the height of this barrier should be lower than 117 meV so that it is possible to detect a wavelength of 10.6 microns. Consequently, the value hv1 should range between 26 and 117 meV. In this example, the choice of the materials and the choice of a width 1b =0.006 microns leads to a height of the potential barrier equal to 70 meV which is suitable for absorbing the configuration of the wave to be detected, namely 10.6 microns. ... The existence of two groups of holes, light holes and heavy holes, as well as the existence of two permitted levels for the heavy holes does not change the operating principle of the above described detector with reference to FIG. 1". Thus Delacourt et al. disclose that a detector comprising of types III-V semiconducting materials is capable of working at ambient temperature (e.g., 300°K) and that the conduction band is populated with electrons by either (1) layer 2 consisting of a rather highly N-type doped semiconductive material or (2) optical pumping with the layer 2 consisting of a non-doped semiconducting material. Therefore, Delacourt et al. teach a detector operating at ambient temperature (e.g., 300°K) wherein the conduction band is populated with electrons by doping so as to allow the wave to be systematically absorbed (i.e., high absorption) to enable detection without the detector being saturated. Liu teaches (third paragraph on pg. 168) that the doping density Nd should be $(m/\pi\hbar 2)(2kBT)$, where m is the effective mass, $\hbar$ is the Planck constant, kB is the Boltzmann constant, and T is the desired operating temperature in degrees K, in order to maximize the detector limited detectivity. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a doping density in the ambient temperature type III-V photodetector of Delacourt et al. suitable for operating at a desired operating temperature (e.g., Si Nd = $(m/\pi\hbar 2)(2kBT)$ = 1.4 x 10^12 cm^-2 for a 300°K ambient operating temperature), in order to populate the conduction band with electrons so as to have high absorption while maximize the detector limited detectivity.

Continuation of 10. Other: proposed amended claims 4-7, 9-17, 21, and 23 and proposed new claim 24 would be rejected under 35 U.S.C. 103(a) as being unpatentable over Delacourt et al. (US 5,160,991) in view of Sato et al. (US 5,077,593) and Liu (Semiconductor and Semimetals, Vol. 62, pg. 129-196, 1999); proposed amended claims 18-20 would be rejected under 35 U.S.C. 103(a) as being unpatentable over Delacourt et al. (US 5,160,991) in view of Sato et al. (US 5,077,593) and Liu (Semiconductor and Semimetals, Vol. 62, pg. 129-196, 1999) as applied to claim 17 above, and further in view of Wen et al. (US 5,352,904) and Brouns (US 5,773,831); and proposed amended claim 22 would be rejected under 35 U.S.C. 103(a) as being unpatentable over Delacourt et al. (US 5,160,991) in view of Sato et al. (US 5,077,593) and Liu (Semiconductor and Semimetals, Vol. 62, pg. 129-196, 1999) as applied to claim 21 above, and further in view of Choi (US 5,384,469).

In applicant's summary of the interview of 15 June 2004, "Claims 1, 4-6, and 8" should probably be --Claims 1 and 4-6-- (see attached PTOL-413).

The declaration under 37 CFR 1.132 filed 16 June 2004 is insufficient to overcome the rejection of claims based upon Delacourt et al. in view of Liu applied under 35 U.S.C. 103 as set forth in the last Office action because: (a) there is no evidence that if persons skilled in the art who were presumably working on the problem knew of the teachings of the above cited references, they would still be unable to solve the problem and (b) alleged copying is not persuasive of nonobviousness since alleged copying may be attributable to other factors (see MPEP 716.06). In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.